



Records of *Cerithium scabridum* Philippi, 1848 (Caenogastropoda, Cerithiidae) from Northwestern Sicily.

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KEYWORDS: *Cerithium scabridum*, Gastropoda, Lessepsian migration, NW Sicily, Mediterranean.

ABSTRACT

Cerithium scabridum Philippi, 1848 is recorded for the first time from Northwestern Sicily in San Vito Lo Capo (Trapani), Mondello and Capo Gallo (Palermo). The distribution of this Lessepsian species along the Mediterranean coast is interpreted from data in the literature. Variation of larval shell sculpture occurs based on comparison between the protoconch as illustrated by HOUBRICK (1992) and a specimen collected in San Vito Lo Capo.

RIASSUNTO

Cerithium scabridum Philippi, 1848 è una specie lessepsiana che presenta una conchiglia di colore marroncino-biancastro con cordoni spiralì tubercolati, caratterizzati da un'alternanza di screzature bianche e marrone scuro, e varici presenti soprattutto sui primi giri di teleoconca. Originariamente distribuita dal Mar Rosso alle coste orientali ed occidentali dell'India, tale specie è stata segnalata nel Mediterraneo orientale dagli inizi del '900 e, per le coste italiane della Sicilia orientale e nord orientale tra la fine degli anni '70 e l'inizio degli anni '80. In questa nota, la distribuzione della specie viene estesa alle coste nord occidentali dell'isola. I primi ritrovamenti risalgono al 1999 e sono avvenuti a San Vito Lo Capo, nella provincia di Trapani. Successivamente (fino al 2002) sono stati ritrovati altri esemplari nei pressi di Palermo, nelle località di Mondello e Capo Gallo. A San Vito Lo Capo e a Mondello sono stati ritrovati complessivamente 17 esemplari vivi; il restante materiale è costituito da conchiglie vuote o abitate da paguri. L'ottimo stato di preservazione delle conchiglie ritrovate a Capo Gallo suggerisce che, anche in questa località, vi risieda una popolazione vivente. Sulla base dei dati di letteratura proponiamo un doppio meccanismo di dispersione ("island-jumping" lungo le coste del Mediterraneo orientale e "shipping" dal Mediterraneo orientale a quello occidentale) analogo a quello descritto per altre specie lessepsiane di molluschi come ad esempio *Brachidontes pharaonis* (P. Fischer, 1870). Inoltre, le osservazioni compiute sulle abbondanze degli individui nelle popolazioni della Sicilia nord occidentale indicano come la colonizzazione non sia avvenuta con successo e possa essere interpretata come incipiente. Sulla base di un confronto effettuato tra la protoconca descritta da HOUBRICK (1992) (protoconca II liscia) e quella di un esemplare raccolto a San Vito Lo Capo (protoconca I liscia, costituita da circa 0.7 giri; protoconca II sculturata, costituita da circa 1.25 giri che recano 4-5 esili cordoncini spiralì, micro tubercoli e pliche subsuturali), si suppone la presenza di una ampia variabilità relativa all'ornamentazione della conchiglia larvale.

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INTRODUCTION

Cerithium scabridum Philippi, 1848 was initially reported from the Red Sea, the Persian Gulf, and the West and East coasts of India (HOUBRICK, 1992). KELLER (1883) reported this species for the first time from the Mediterranean Sea near Port Said, Egypt. Successively *C. scabridum* was reported from additional localities, in Egypt and Syria (PALLARY, 1913, 1938), Israel (BARASH & DANIN, 1977), East and Northeast Sicily (PIANI, 1979; DI NATALE, 1982), Naples (MIENIS, 1985), Lebanon (BOGI & KHARALLAH, 1987), Southern Turkey (ENGL, 1995), Cyprus and Tunisia, Djerba (Ciesm.org, 2000) (see Fig. 1).

C. scabridum is easily distinguished from the other congeneric species by the contrasted color pattern of white and dark brown mottles on the cords and the general brown-whitish color of the shell. The height of the shell ranges between 12 and 20 mm and strong knobs with some varixes (mainly on the early teleoconch) characterize the sculpture.

In the Mediterranean Sea *C. scabridum* usually lives in shallow waters both on soft and hard substrata and in some cases associated with *Cymodo-*

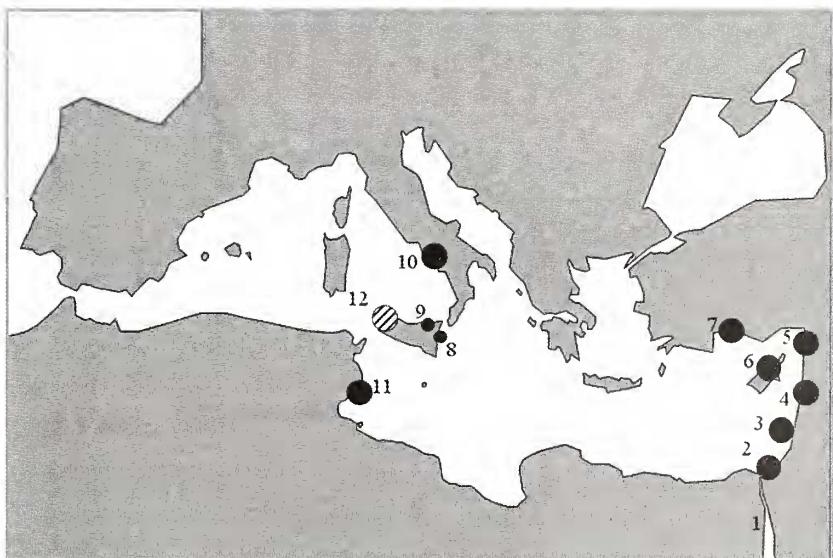


Fig. 1. Records of *C. scabridum* along the Mediterranean coast from 1883 to 2002. Black-white circle indicates the new record in Northwestern Sicily. 1=Red Sea; 2=Egypt; 3=Israel; 4=Lebanon; 5=Syria; 6=Cyprus; 7=South Turkey; 8=Capo Passero, Augusta, Vendicari; 9=Milazzo; 10=Naples; 11=Djerba, Tunisia; 12=San Vito Lo Capo, Capo Gallo, Mondello.

Fig. 1. Ritrovamenti di *C. scabridum* lungo le coste del Mediterraneo dal 1883 al 2002. Il cerchietto bianco e nero indica il nuovo ritrovamento, avvenuto nella Sicilia nord-occidentale. 1=Mar Rosso; 2=Egitto; 3=Israele; 4=Libano; 5=Siria; 6=Cipro; 7=Turchia meridionale; 8=Capo Passero, Augusta, Vendicari; 9=Milazzo; 10=Napoli; 11=Djerba, Tunisia; 12=San Vito Lo Capo, Capo Gallo, Mondello.

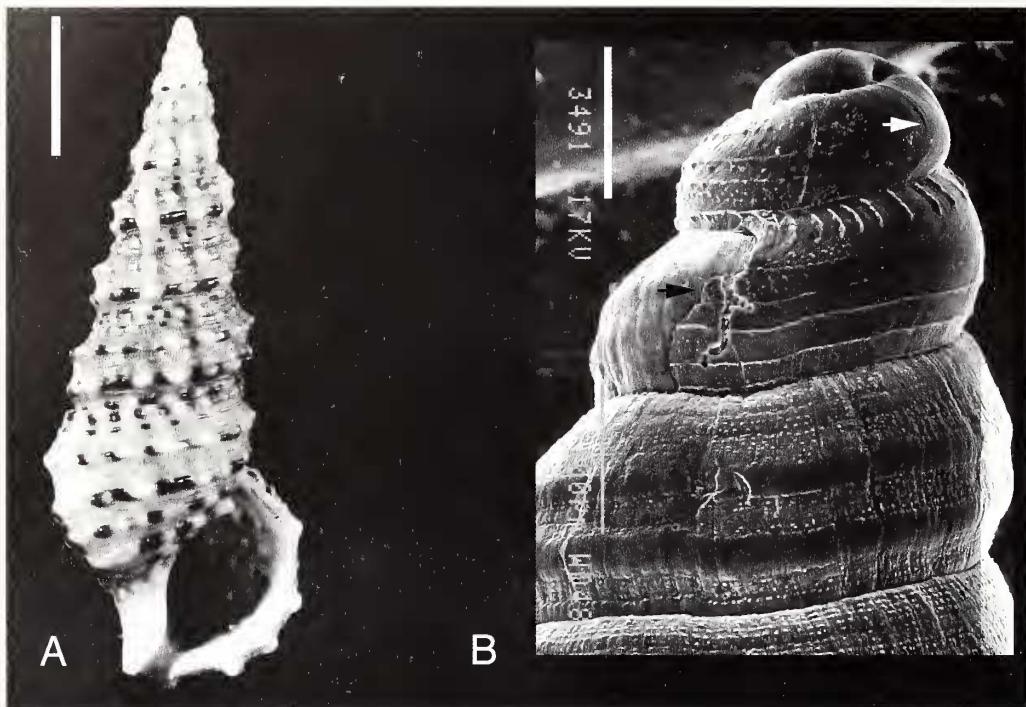


Fig. 2. *Cerithium scabridum* from Northwestern Sicily. A, shell collected at Capo Gallo (Palermo), h=16 mm. The typical sculpture with contrasted color pattern of white and dark mottles on the spiral cord is shown. B, S.E.M. photograph of protoconch from San Vito Lo Capo (Trapani); white and black arrows indicate respectively the protoconch I/protoconch II and protoconch II/teleoconch demarcations; note the smooth protoconch I and the sculptured protoconch II with 4-5 spiral cords having micro-tubercles between themselves, subsutural plicae are also evident. Scale bars: 3.5 mm in A and 100 µm in B.

Fig. 2. *Cerithium scabridum* dalla Sicilia nord-occidentale. A, conchiglia rinvenuta a Capo Gallo (Palermo), h=16 mm. E' evidente la tipica ornamentazione, data da cordoncini spiralari con alternanza di screziazioni bianche e marrone scuro. B, fotografia al S.E.M. della protoconca di un esemplare proveniente da San Vito Lo Capo (Trapani); le frecce bianche e nere indicano, rispettivamente, il confine protoconca I/protoconca II e quello protoconca II/teleoconca; notare la protoconca I liscia e l'ornamentazione della protoconca II, costituita da pliche subsuturali e da 4-5 cordoncini spiralari a cui sono interposti dei microtubercoli. Scala di riferimento: 3,5 mm in A e 100 µm in B.

Cea nodosa (Ucria) Ascheton, 1867 and *Zostera nana* Roth, 1792 (DI NATALE, 1982). In many localities *C. scabridum* constitutes large and stable populations (BARASH & DANIN, 1973; GHISOTTI, 1974; LAVIE & NEVO, 1986). We record *C. scabridum* here for the first time from Northwest Sicily and we explain the distribution pattern by means of the available data in the literature.

EXAMINED MATERIAL

The first record of *Cerithium scabridum* from Northwest Sicily occurred in the spring 1999, in the small harbour of San Vito Lo Capo (Trapani) where 16 specimens (11 living) were collected. Between 1999 and 2002, several specimens were also collected near Palermo, at Mondello and at Capo Gallo (Table I). At the Mondello location six living individuals were collected, in addition to 40 shells inhabited by hermit crabs. On the other hand at the Capo Gallo location several fresh shells inhabited by hermit crabs were collected between 2000 and 2002 but no living specimens were found.

RESULTS AND DISCUSSION

Dimensions, morphology and color of collected specimens were in agreement with the description of typical *C. scabridum* by

HOUBRICK (1992) (Fig. 2A). Only the analysis of the shell apex revealed some differences in larval shell sculpture compared to HOUBRICK's description (1992, p. 174, fig. D). One of the specimens collected in San Vito Lo Capo

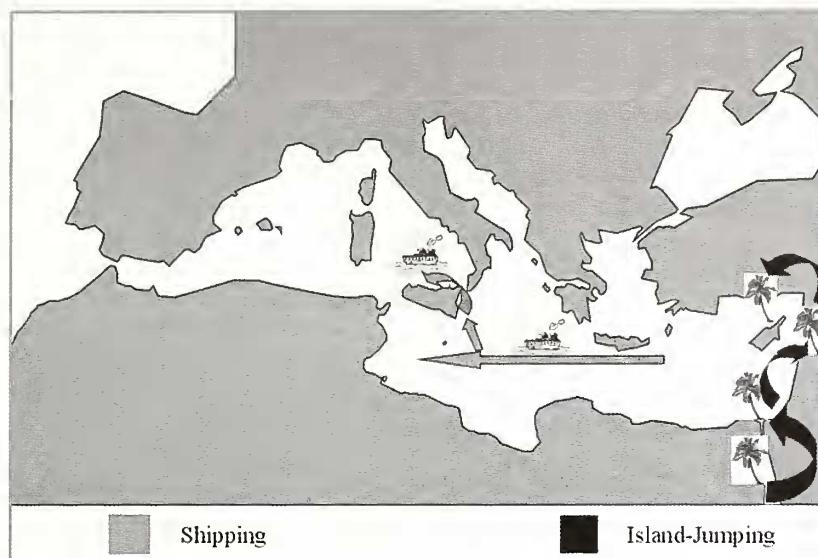
showed a smooth protoconch I consisting of about 0.7 whorl (according to the method as described by VERDUIN, 1977) and a sculptured protoconch II consisting of about 1.25 whorls bearing 4-5 very fine spiral threads, irregular microscopic dots and subsutural plicae (Fig. 2B).

The presence of *C. scabridum* in Sicily and in Southeastern Tunisia is likely due to shipping from the Eastern Mediterranean. This dispersal mechanism from Eastern to Western Mediterranean is well documented for other species that, like *C. scabridum*, are good colonizers (CHEMELLO & OLIVERIO, 1995; GIANGUZZA *et al.*, 1998). In fact *C. scabridum* has an r-selected teophorective strategy with a planktotrophic, long-lived larval stage (45-60 days) and a wide niche (AYAL, 1978; AYAL & SAFRIEL 1977; 1982; LAVIE & NEVO, 1986). HOUBRICK (1992) is

Site	Total number of shells	Living specimens	Collection year
San Vito Lo Capo, Trapani, Garilli Coll.	16	11	1999
Mondello, Palermo, Garilli Coll.	46	6	1999-2002
Capo Gallo, Palermo, Caruso Coll.	30	-	2000-2002

Table I. Collection sites and years for the three localities where *C. scabridum* was found in Northwestern Sicily.

Tabella I. Località e cronologia dei rinvenimenti e relativo numero dei esemplari di *C. scabridum* nella Sicilia nordoccidentale.



in doubt about the length of the larval period because of the smoothness of protoconch II. Our discovery of a specimen bearing clear ornamentation of protoconch II suggests a wide variability of larval shell sculpture and therefore the need of more accurate analysis of this character in correlation with the length of the larval stage.

Distribution along the Eastern Mediterranean coast can be due to an "island-jumping" mechanism (CHEMELLO & OLIVERIO, 1995). *C. scabridum* from the Egyptian coast colonized Syria and successively Lebanon, Israel and South Turkey with a pattern known for other molluscan species (CHEMELLO & OLIVERIO, 1995; GIANGUZZA *et al.*, 1998). Consequently a double dispersal mechanism can be invoked to explain the distribution pattern of *C. scabridum* (Fig. 3). A similar distribution pattern was already described for other molluscs, like *Brachidontes pharaonis* (P. Fischer, 1870) (GIANGUZZA *et al.*, 1998).

In Sicily *C. scabridum* was reported only from the Eastern (PIANI, 1979) and, in 1972, for the Northeastern coast at Capo Milazzo (DI NATALE, 1982). We report it for the first time in the Northwestern coast of Sicily. Living specimens were recorded in San Vito Lo Capo and in Mondello. In Capo Gallo only shells inhabited by hermit crabs were collected, but the high frequency of shells in a good state of conservation strongly suggests the presence of a living population in this locality.

With the available data it is not possible to determine the exact direction and mechanism of dispersion used by *C. scabridum* to colonize Northwestern Sicily. The analogous distribution pattern of *Cerithium scabridum* and *Brachidontes pharaonis*, a colonizing Red Sea bivalve species with a similar reproductive strategy, shows that the colonization may proceed from the Northeastern to the North and the Northwestern Sicilian coast and shipping may play an important role in the mechanism of dispersion. Moreover our initial observations during the last four years on the abundance of living individuals suggest that the populations of Northwestern Sicily are not yet stable. No data are available concerning the stability of the Northeastern population. In conclusion, in the coming years qualitative and quantitative monitoring of the population dynamics of this

Fig. 3. Interpretation of the mechanism of dispersion by means of data available in the literature for *C. scabridum* and other Lessepsian molluscan species. Grey arrows indicate shipping, black arrows indicate island-jumping.

Fig. 3. Interpretazione del possibile meccanismo di dispersione di *C. scabridum* alla luce delle informazioni disponibili in letteratura per questa ed altre specie di molluschi lessepsiani. Le frecce grigie indicano il trasporto delle larve tramite l'acqua di zavorra delle navi ("shipping"), quelle nere indicano la dispersione progressiva delle larve che colonizzano nuove aree passo passo ("island jumping").

cerithid species is needed to determine the degree of colonization that at the moment can be defined as incipient.

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